RESPONSE TO DETAILED OFFICE ACTION

Claim Rejection – 35 USC § 102 - response

1. The invention as described in the specification is unique in its combination of data transport of a high speed data communication over fiber and fault location in a single transceiver geared to single fiber single wavelength links. In order to better delineate this feature the claims were amended where appropriate. The amended claims with markup are enclosed as Appendix A. The following sections discuss each issue the examiner raised re prior art. For ease of follow-up we keep the paragraph numbers matched to the examiner's report.

Dennis et al.

2. Claims 1-3, and 8-14 were rejected as being anticipated by Dennis et al. (US 5,539,560) hereinafter "Dennis".

Regarding claim 1

Dennis does not disclose nor anticipates the implementation of high speed bi-directional data link over single fiber that is also capable to localize faults. Hence his apparatus will not be able to function similarly since it can't receive high speed data nor can it transmit high speed data. Dennis invention has two modes: "test mode and a control mode" (col.3 lines 64-65). The router functionality of Dennis enables testing of multiple fibers controlled via remote router. Dennis actually utilizes two transmitters for his invention 14 and 16. Dennis does not disclose nor anticipate the ability to conduct bidirectional data communication on the same linked fiber that his apparatus can test, using the same transceiver components – same transmitter and same receiver. The amended claim 1 defines the distinction better, based on our disclosure.

Regarding claim 2

Dennis transmitter can't transmit high speed data and receiver can't receive high speed data.

Regarding claim 3

Dennis does not teach a controlling laser driver that has both modulation current control and bias current controls. On the contrary in col. 4 lines 1-8 the OTDR controller 12 cause the laser diode 14 to emit brief pulses of light with constant energy and varying interval. This is not the functionality of a laser driver that transmits constant low power under bias control and increased intensity based on data modulation.

Regarding claim 8

Dennis does not teach a controlling laser driver that can transmit a code sequence. As described by Dennis in col. 4 lines 1-8 the OTDR controller 12 cause the laser diode 14 to emit brief pulses of light with constant energy and varying interval. The varying interval is an OTDR functionality that enables scanning different distances. This is not the functionality of a laser driver that transmit a code which is a unique combination of 1's and 0's that can be received and distinguished in a receiver.

Regarding claim 9

Dennis does not teach a receiver that can detect a code sequence. The "receiver" described by Dennis is a photodiode 32, linear amplifier (that is required to maintain the signal proportional to the reflected power) and A/D converter 36 that is processed by the processor 40. The receiver as described in our invention does not process signals proportional to the optical power. It process the incoming light pulses and compare those to threshold value. If it is above the value we get a 1 and below it is a zero and this functionality of the receiver enable code detection. Dennis does not describe nor imply such functionality.

Regarding claim 10

Dennis does not teach a method of detecting high optical reflection in a single fiber high speed data link. The modes described by our inventions are high speed data transport and a test mode. The modes described by Dennis are "test mode and a control mode" (col.3 lines 64-65). The

control mode is for setting the router output port. It can't be view as being similar to, or a precursor of, a single fiber bi-directional link as described in our invention.

Regarding claim 11

Dennis does not teach a test method that comprises modulating a data transmission laser at a power level higher that what is required for data transport. In col. 4 lines 1-4 Dennis describe test mode laser operation 14. The control mode laser is 16. Dennis actually describes operation of 2 lasers over the same fiber each with fixed power control. The modes described by our inventions are high speed data transport and a test mode. The modes described by Dennis are "test mode and a control mode" (col. 3 lines 64-65). The control mode is for setting the router output port. It can't be view as being similar to or a precursor of a single fiber bi-directional link as described in our invention.

Regarding claim 12

Dennis does not teach a test method that comprises modulating a data transmission laser at a lower frequency compared with the data transport frequency. The fact that he uses 2 lasers with different wavelength 1310 and 1550 nm is sufficient to distinguish it from our invention, where a single laser has a single wavelength.

Regarding claim 13

Since claim 12 is a dependent claim on claim 10 and we have distinguished the current application from Dennis, the actual localization based on timing is similar. But the underlying methodology is different as explained above.

Regarding claim 14

Dennis does not teach a method to increase the laser power during transmission of test pulse. Actually on col. 4 line 4 Dennis states "the intensity of the light pulses remains essentially the

constant". He does not teach how to do the testing using a data transmission transceiver and he does not teach using it with a single laser.

Claim Rejection – 35 USC § 103 - response

3. Rejection based on obviousness must pass the test of "been obvious at the time ... to a person having ordinary skill in the art". The fact of the matter is that till today there is no equivalent product on the market and furthermore, in the inventor interactions with experts in the field, the theory of operations and the implementation need to be explained time and again. The assignee of this invention is currently the only supplier in the market with such device employing such method.

4. Claims 4-7 were rejected as being un-patentable over Dennis in view of Kimbrough. We have clarified the claims where necessary to distinguish the current invention from prior art. In the discussion below we articulate the differences.

Regarding claim 4

Claim 4 was modified to emphasize that the transistor, 121 in Fig. 5, is an addition to the Laser Driver 114 in Fig. 5. Kimbrough et al. (US Pub No. 2002/0063924) hereinafter Kimbrough, teaches an optical transceiver for data link where the laser 86A in Fig. 6 is driven by dedicated transistor (80 in Fig. 6). This transistor (86A) is the laser driver equivalent to 114 in the current invention. Skilled artisan in fiber optic transceiver field knows that a laser driver contain one or more output transistors that drive bias and modulation currents into the laser. In claim 4 we add an additional transistor under direct control of the microcontroller and not in the data path, to be utilized only during the test mode to increase the test pulse energy. Dennis does not teach a method to increase the laser power during transmission of test pulse. His test pulse laser has a fixed power and his control laser (a different laser) also has a stable constant power. Since Dennis invention is a test router that enables OTDR testing of multiple fiber via remote router, with no ability to transfer data, Dennis invention does not describe nor implies varying the transmitter power. Kimbrough depicts data transport scheme for PON but no test or

instrumentation capability. The combination of the two is not straight forward and is not anticipated by either disclosure nor can be viewed as obvious to a person with ordinary skill in the art.

Regarding claim 5

Transimedance amplifier is known in the art of fiber optic transceivers, and is used in the data path. Dennis amplifier for OTDR reflected signal is a linear amplifier that feeds A/D for amplitude measurment to enable amplitude analysis by the controller. In our claim 5 we enable the microcontroller to monitor the output of the transimedance through a comparator. Dennis does not teach such a dual purpose scheme of the receiver. The combination of data transport and output monitoring by the microcontroller is not straight forward and is not anticipated by Dennis's disclosure nor can be viewed as obvious to a person with ordinary skill in the art.

Regarding claim 6

The comparator hinted by Kimbrough in 106 Fig 6 is connected through LPF (Low Pass Filter) and then to a comparator. The disclosure of Kimbrough does not discuss it directly but it is understood by a person skilled in the field that the purpose of the 106 output is to perform the functionality of signal detect. This connection is used to ascertain the data validity. It is not similar to the connection to a microcontroller to facilitate fast detection of reflected pulses to perform distance calculation. LPF actually provides the average value of a continuous stream.

Regarding claim 7

The combined invention of Dennis and Kimbrough does not teach the possibility to combine OTDR functionality within a full data link transceiver sharing common parts. The sensitivity level change is done to increase the detection level of the OTDR functionality – that still goes through the comparator. This is not the case as stated "This is done to ensure that all signals, no matter how weak, are all received by the transceiver". The comparator function is to eliminate very weak signals.

5. Claim 15 was rejected as being un-patentable over Dennis under 35 U.S.C. 103(a).

Regarding claim 15

Dennis does not teach nor imply change in sensitivity in the receiver because his receiver is dedicated to reflection detection and is feeding directly through an amplifier into an A/D that quantifies the level of reflections. It is not known to combine data transport transceiver with an OTDR receiver and hence it can't be constructed as obvious to a person skilled in the art to do so.

Conclusion

6. We have clarified and amended claims 1, 4, 10, 11, 12 to further enhance the distinction of the current invention and its new and unique way of performing the functions disclosed. Reexamination and reconsideration are respectfully requested.

Based on the above amendments and the accompanying responses, Applicant respectfully submits that all pending claims are in condition for allowance and requests a Notice of Allowance. Applicant encourages the Examiner to telephone the undersigned assignee and inventor if it appears that any impediment remains to the allowance of the application.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class priority mail in an envelope addressed to: Mail Stop Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on August 16, 2007 by

Signature: Ed Polunin

August 16, 2007

Respectfully submitted,

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